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A theoretical approach to segmenting children's walking behaviour

Introduction

While market segmentation is almost ubiquitously applied in commercial marketing (Cody, 2012), it has received less attention in marketing aiming to change behaviours for the benefit of individuals, communities and/or society (Raval and Subramanian, 2004; Walsh *et al.*, 2010). This is unexpected given market segmentation is considered a fundamental component of social marketing (Andreasen, 2002; National Social Marketing Centre, 2006), which aims to change the ideas and behaviours of target audiences for the social good (Peattie and Peattie, 2009). Growing pressure to demonstrate return on investment for social marketing programs (Evans-Lacko *et al.*, 2013), however, is likely to increase the focus on market segmentation as a means to ensure optimal resource allocation. That is, market segmentation is based on the principle that the efficiency and effectiveness of marketing can be optimised by identifying groups with similar needs and wants, selecting the group/s most aligned with organisational goals and targeting the group/s with a tailored offering (Dibb, 1998).

In particular, there has been limited examination and application of segmentation in marketing aiming to improve the health of children (exceptions McLeay and Oglethorpe, 2013; Olds *et al.*, 2013). This dearth of research is surprising given increasing concern regarding childhood obesity. Childhood obesity is now considered a foremost public health crisis in both developed and developing countries (Wang and Lim, 2012) owing to its growing prevalence and detrimental effects on children's physical and psychological health in the short and long term (see Reilly *et al.*, 2003; WHO, 2014). Since studies in commercial marketing highlight substantial differences between segments in the child, adolescent and

young adults markets (see Akturan *et al.*, 2010; Cody, 2012; Foscht *et al.*, 2010), continued examination of the principle of market segmentation in social marketing aiming to improve the health of children is arguably warranted. As such, application of the principle of market segmentation within this context forms the focus of the present research.

Although a number of environmental and perinatal factors have been found to underlie childhood obesity (Ebbeling *et al.*, 2002), increases in children's weight have coincided with declines in active transportation, such as walking, to and from school (Salmon *et al.*, 2005). Research shows that active transportation to school is associated with greater levels of physical activity and lower levels of obesity while controlling for diet (Mendoza *et al.*, 2011). Walking to and from school in particular may be a low cost (Rosenberg *et al.*, 2006), near universally accessible means of reducing children's weight (Scott *et al.*, 2007) that can be easily integrated into daily routine (Brophy *et al.*, 2011). As such, walk to school behaviour forms the specific behavioural context of this research.

A further consideration is that theories of behaviour can enhance the value of market segmentation by helping to identify factors that influence behaviour change for different segments (Doner Lotenberg *et al.*, 2012). This proposition is consistent with evidence showing that programs that promote the rejection of risky behaviours and the adoption of protective behaviours are more likely to be effective if they are informed by theory (Gordon *et al.*, 2006). Accordingly, the present research will extend existing literature by employing the Theory of Planned Behaviour (TPB) (Ajzen, 1991) within the segmentation process to provide additional insight for improving the health of children, particularly as it relates to changing intentions to increase walking to/from school.

This study therefore contributes to the literature in two primary ways. First, it extends research into market segmentation within social contexts. In particular, the research provides insight into the validity of market segmentation within the context of positively changing the physical activity behaviour of children. Further, by employing the TPB, this research provides further empirical insight into the usefulness of theories of behaviour in market segmentation. Specifically, it investigates the usefulness of the TPB factors (subjective norms, attitude, perceived behavioural control and behavioural intentions) in identifying distinct target segment groups.

The article is structured as follows. First, we provide a review of the marketing segmentation literature within social contexts. Following this, the conceptual framework of the study is outlined. Next, details of the methodology of the current research are presented. Last the results of the research, along with their implications, are outlined.

Using market segmentation in changing behaviours for social good

Just as in commercial contexts, through systematic segmentation, marketers aiming to change behaviour for social good can identify groups of individuals most in need (Donovan and Henley, 2003) or most willing or able to make the desired behaviour change (Doner Lotenberg *et al.*, 2012). Although it is acknowledged that there is debate about the ethicality of a market segmentation approach (see Newton *et al.*, 2013), what remains uncontested is that segmentation can increase the efficiency and effectiveness of social marketing efforts (Andreasen, 2002; Kotler and Lee, 2008; McLeay and Oglethorpe, 2013). This is particularly relevant given social marketing programs are often supported by only limited resources (Newton *et al.*, 2013). Despite this, segmentation has only been applied in a few studies

within social marketing (e.g. Fine, 1980; Gray and Bean, 2011; Rimal *et al.*, 2009; Walsh *et al.*, 2010). These studies, however, show that not only do distinct market segments exist within social contexts, but they have differential responses to social marketing programs (Gray and Bean, 2011; Walsh *et al.*, 2010). Gray and Bean (2011) employ psychographic, behavioural and demographic variables to segment the market and gain insight into the responses of identified segments to hypothetical incentives to encourage household energy conservation. Walsh *et al.* (2010), on the other hand, segmented the smoker market on the basis of psychographic variables and found the segments responded differentially to social advertising encouraging smoking cessation.

In particular, only a few empirical studies have examined market segmentation in social marketing aiming to improve the health of children as it relates to targeting overweight and obesity (exceptions McLeay and Oglesby, 2013; Olds *et al.*, 2013). Olds *et al.* (2013) employed psychographic segmentation to identify three distinct segments of parents and their children based on their attitude toward obesity. The attitudinal beliefs of these three segments provided insights for the tailoring of anti-obesity social marketing initiatives in Australia. McLeay and Oglesby (2013) examined demographic and psychographic variables to identify four segments of Nigerian parents based on their knowledge of nutrition and diet, as well as their food purchasing behaviour for their children. Both studies emphasise the importance of a segmented social marketing approach to target obesity reduction, thereby improving the health of children.

Specifically in the context of walk to school behaviour, there has been no previous attempt to employ segmentation to generate market insights. Extant research focuses on examining the demographic characteristics of the target audience that influence walk to school behaviour.

For instance, walking to and from school has been found to be less prevalent in girls (Yeung *et al.*, 2008) and children from higher socio-economic backgrounds (Spallek *et al.*, 2006), but more prevalent in older children (e.g. Rodriguez and Vogt, 2009; Yeung *et al.*, 2008). The number of cars owned by the household and the distance to school are factors frequently reported to negatively impact children's active transportation to school (e.g. Merom *et al.*, 2006; Timperio *et al.*, 2004). In addition to demographic factors, parental concern or perceived risk with regard to road safety and unwelcome approaches by strangers has also been found to reduce the instance of children walking to and/or from school (Merom *et al.*, 2006).

Given the limited research in the area, it is not surprising that few marketing programs aiming to improve children's health are based on segmentation and targeting efforts. Two exceptions are Power Play (see Keihner *et al.*, 2011) and Team Nutrition (see Levine *et al.*, 2002).

Power Play used ten grade-specific activities to target eating behaviours. For example, Grade 4 children made a plan to include at least five servings of fruit and vegetables in their day, and Grade 5 children made a plan that incorporated fruit and vegetables and limited unhealthy foods. In a similar way, Team Nutrition also used grade-specific activities for 1) pre-kindergarten and kindergarten, 2) first and second grades, and 3) third through fifth grades.

Overall, the limited examination and application of market segmentation, particularly as it relates to improving children's health, highlights the need for further research in this domain. This research aims to contribute to addressing this gap in the literature employing an approach that utilises all four segmentation bases, namely demographic, geographic,

behavioural and psychographic (Dibb *et al.*, 2002), while simultaneously encompassing the Theory of Planned Behaviour (TPB), which is discussed next.

Conceptual framework

The TPB has been previously employed to segment markets within social contexts such as travel behaviour (see Anable, 2005). However, to the knowledge of the authors, the TPB has not previously been applied by segmentation studies within the physical activity context. Nevertheless, the TPB has been widely applied to improve understanding of the determinants of physical activity (Scott *et al.*, 2007). A meta-analysis across 72 studies demonstrated the explanatory power of TPB for this type of health behaviour (Hagger *et al.*, 2002). Since this meta-analysis, Rhodes and Courneya (2003) have found that the TPB explained 32% of the variance in adults' intentions to exercise and 28% of exercise behaviour, with the strongest predictors in the model being attitude and perceived behavioural control. This suggests that the TPB is a suitable framework for improving understanding of a market for the purpose of changing physical activity behaviour.

The TPB posits that voluntary behaviour can be predicted based on the behavioural intention of the individual. In turn, behavioural intention is proposed to be jointly determined by positive attitude, subjective norms and perceived behavioural control. Attitude is a tendency to evaluate or appraise a behaviour favourably or unfavourably (Ajzen, 1991). Attitude comprises both instrumental (i.e. belief-based) and affective (i.e. emotion-based) components (French *et al.*, 2005). Subjective norms relate to the individual's perception of whether important reference groups support or reject the behaviour (Ajzen, 1991). Subjective norms are formed by an individual's perception of the normative beliefs held by important others

towards the behaviour together with the extent to which the individual is motivated to comply with these normative beliefs (Manning, 2009). Last, perceived behavioural control refers to “peoples’ perception of the ease or difficulty of performing the behaviour of interest” (Ajzen, 1991, p. 183). It reflects individuals’ belief regarding their access to external resources and opportunities needed to perform a behaviour.

Method

Target population

The target population for this research was caregivers (e.g. parents, grandparents, etc.) responsible for getting a child to and/or from school in Victoria, Australia. About 20-25% of Australian children are overweight or obese (Olds *et al.*, 2010). This study focused on primary school children, typically aged between five and 12 years old, on the basis that lifelong physical activity patterns are established in childhood and as such, early childhood intervention is important to achieving long term improvements in health (Faulkner *et al.*, 2009). It was decided to focus on caregivers, rather than children themselves, given parental control over younger children’s transportation to school (Carver *et al.*, 2010).

Online survey

An online survey was used to collect data. Online advertising was used to disseminate the survey through multiple channels, including Facebook and Twitter. The survey took approximately 10 minutes to complete and respondents were offered the equal chance of winning one of twenty AUS\$30 gift cards for their participation. The online survey comprised previously validated scales for the TPB constructs: subjective norms (Perugini and Conner, 2000), perceived behavioural control (Rhodes and Courneya, 2003), attitude

(Norman and Conner, 2006; Scott *et al.*, 2007) and behavioural intention (Rundle-Thiele *et al.*, 2013). The survey was pre-tested via an informal expert review with seven social marketing researchers. On the basis of feedback, the readability of the introduction to the survey was improved and the ordering of some questions altered. The study was given ethics approval by the Human Research Ethics Committee (Approval no. MKT/27/13/HREC) at (*institution withheld to preserve author anonymity*).

Sample

We collected a purposive sample of 512 caregivers of primary school children in Victoria, Australia. Non-probability sampling is considered acceptable in exploratory research such as this study (Malhotra, 2004). Further, the sample size is comparable to 40% of data-driven segmentation studies in a systematic review, which contain between 200 and 500 sample objects (Dolnicar, 2002). The sample comprised mostly employed (64.5%) mothers (87.8%). The largest proportion of respondents was aged between 40 and 44 years old (31.1%) and had achieved a trade certificate or diploma (31.8%). The children that formed the focus of the survey were relatively evenly spread in terms of their age, from five years to 12 years old, with the largest proportion of children being seven years old (18.7%). There was also an even split in terms of the children's gender (female: 48.2%, male: 51.8%). Approximately 50% (51.6%) of the sample reported that their child usually walked to or from school, with approximately 20% walking to (22.6%) or from (19.9%) school five days a week. The walking rate obtained by this study appears higher than results showing approximately 25% of Australian children walked to school in 2003 (van der Ploeg *et al.*, 2008), although the measurement compatibility across these two studies is unclear.

Analysis

First the reliability and validity of the TPB construct scales were examined. Specifically, a confirmatory factor analysis was undertaken in SPSS AMOS 21. After data cleaning, including listwise deletion of cases with missing values, a final sample size of 432 was achieved. Given the data was missing completely at random (Little's MCAR test $>.05$), listwise deletion of missing data was used since it does not introduce any bias into the data set (Allison, 2003). The measurement model demonstrated close fit to the data: χ^2 (80, $n = 432$) = 129.422, Bollen-Stine $p < .05$; $\chi^2/df = 1.618$; CFI = .994; TLI = .992; RMSEA = .038; and SRMR = .0313. Further, the standardized factor loadings were all significant and above .70, with the exception of one perceived behavioural control item ($\Lambda = .692$, $p < .05$). The observed variables' squared multiple correlations (R^2) all exceeded .50, with the exception of the same perceived behavioural control item which again closely approached the cutoff ($R^2 = .479$). Moreover, All Cronbach's Alpha coefficients (see Table 1) exceeded .70. The perceived behavioural control item was retained on the basis that modifications to models should be done sparingly and only when theoretically plausible (Jackson *et al.*, 2009). Convergent validity was established since the composite reliabilities for each construct exceeded .70 and the average variance extracted (AVE) for each construct exceeded .50 (see Table 1). Since the squared correlation between each pair of constructs was less than the corresponding AVEs, this provides evidence of discriminant validity.

Insert Table 1

After summing the scale items, following the procedures set out by Norusis (2011), two-step cluster analysis in SPSS 21 was used to reveal natural groupings in the data set (containing 512 respondents). Two-step cluster analysis is considered the most appropriate

technique for this study given its exploratory nature, specifically since neither the number nor the members of the clusters are known (Chan *et al.*, 2006). Further, two-step cluster analysis forms clusters based on both continuous and categorical data (Norusis, 2011). As such, two-step cluster analysis has previously been applied in segmentation studies (e.g. Chan *et al.*, 2006; McLernon *et al.*, 2012). In the first step, original cases are grouped into pre-clusters based on log-likelihood distance (Okasaki, 2007). In the second step, this is then reduced to the best number of clusters on the basis of Schwartz's Bayesian information criterion (BIC) (Norusis, 2011). The 14 variables selected for analysis covered the four bases of segmentation (Dibb *et al.*, 2002): demographic (i.e. employment and education status, income, age of the child and the caregiver, number of cars owned by the household, number of children under the care of the respondent), geographic (i.e. approximate distance to school), psychographic (i.e. subjective norms, perceived behavioural control and attitude) and behavioural (i.e. walking behaviour and behavioural intentions). Chi-square and One-way ANOVA tests were performed on the categorical and continuous variables respectively to validate the significant differences among clusters.

Results and discussion

Three distinct clusters were revealed within the data set using 14 segmentation variables, including the TPB variables (instrumental attitudes, affective attitudes, perceived behavioural control, subjective norms and behavioural intentions). The silhouette coefficient, which is a measure of cohesion and separation, was 0.1 (Norusis, 2011). This is comparable to other market segmentation studies (see Lamont and Jenkins, 2013). Chi-square and One-way ANOVA tests confirmed the clusters varied significantly across the 14 segmentation variables, with the exception of caregivers' highest level of educational attainment ($\chi^2 =$

16.406, d.f. = 10, $p = 0.089$). This result is unsurprising given education's importance level (Importance = 0.01), which was the lowest of all segmentation variables (refer to Table 2). An importance rating of between 0.8 and 1.0 indicates the variable was highly important to cluster formation, whereas a rating of between 0.0 and 0.2 indicates the variable was less important (Norusis, 2011).

Four variables were found to be highly important to cluster formation in the present study: distance to school (Importance = 1.00), current walk to/from school behaviour (Importance = 0.84), subjective norms (Importance = 0.53) and caregivers' intentions to increase their child's walk to school behaviour (Importance = 0.23). The approximate distance between the child's home and their school was the most important variable in defining the clusters. This is consistent with research showing distance to school is an important factor in active transportation to school (e.g. Merom *et al.*, 2006; Timperio *et al.*, 2004).

The three segments identified by the research were roughly equally sized. Segment 1, '*Short-distance Frequent Walkers*' (37.8%), was slightly larger than segment 2, '*Long-distance Non-Walkers*' (33.0%), and segment 3, '*Middle-distance Sporadic Walkers*' (29.2%). The results showed the majority of *Short-distance Frequent Walkers* live less than 1km from the child's school. Approximately 65% of the children within this segment reportedly walked to/from school seven times per week on average. In contrast, children from the *Middle-distance Sporadic Walkers* segment reportedly walked 2.7 times on average per week to/from school, which is situated at a distance of less than 2km from home for most (54.9%). *Long-distance Non-Walkers* live the greatest distance from school, with the majority (62.3%) living greater than 5km from the school. Not unexpectedly, the children within this segment do not typically walk to/from school (less than once on average per week). Further, the data shows

that on average, *Long-distance Non-Walkers* do not intend to increase the number of times their children walk to/from school ($M = 1.9$, $SD = 1.6$). Similarly, neither *Short-distance Frequent Walkers* ($M = 3.8$, $SD = 2.2$) nor *Middle-distance Sporadic Walkers* ($M = 3.9$, $SD = 2.2$) have positive intentions to increase the number of times their children walk to/from school.

Insert Table 2

Moreover, the results showed that *Short-distance Frequent Walkers* on average hold a very strong belief that people important to them would approve of their child walking to/from school ($M = 5.7$, $SD = 1.2$). This belief was weaker for *Middle-distance Sporadic Walkers* ($M = 4.5$, $SD = 1.6$). In contrast to the other two segments, *Long-distance Non-Walkers* believed that people important to them would disapprove of their child walking to/from school ($M = 3.1$, $SD = 1.6$), which may be attributable to the greater distance to school for the majority of this segment. Specifically, there may have been greater perceived concern over road safety given the distance, a factor identified in extant research as significantly influencing walk to school behaviour (Merom *et al.*, 2006). In addition, these findings appear to be consistent with the predictions of the TPB when taken together with the average walk to school behaviour of children in the segments (see Ajzen, 1991). That is, it seems the more or less supportive each segment perceives others to be of their children walking to school corresponds to higher or lower levels of walking behaviour in the segment. Although empirically testing this relationship is beyond the scope of this study, future research could test this proposition within this behavioural context.

Long-distance Non-Walkers perceived the least, on average, control over their child's walk to school behaviour ($M = 4.4$, $SD = 2.2$) compared to *Middle-distance Sporadic Walkers* ($M = 5.7$, $SD = 1.4$) and *Short-distance Frequent Walkers* ($M = 5.9$, $SD = 1.3$). Again this finding appears to be consistent with the TPB, with greater perceived control corresponding to higher walk to school behaviour across the segments (Ajzen, 1991). In addition to the greater distance to school, this result may be attributable to the fact that the *Long-distance Non-Walkers* comprises the highest proportion of employed individuals (81.2%). Full time employment may have negatively impacted this segment's belief regarding their access to sufficient time to facilitate their child walking to/from school. In contrast, *Middle-distance Sporadic Walkers* are mostly engaged in home duties (55.7%).

Although all three segments possessed a positive instrumental attitude toward walking to school behaviour, *Short-distance Frequent Walkers* held the strongest belief that walking to school was beneficial, good and valuable ($M = 6.7$, $SD = 1.0$). *Short-distance Frequent Walkers* also held the strongest belief that walking to school was exciting, pleasant and enjoyable ($M = 6.2$, $SD = 0.9$). Given that the children of this segment demonstrated the most frequent walk to school behaviour, this finding also appears consistent with the TPB's specification that positive attitude toward the behaviour leads to performance of the behaviour. Interestingly, however, *Long-distance Non-Walkers* possessed a more positive instrumental and affective attitude than *Middle-distance Sporadic Walkers* even though their children walked to/from school less often. This finding contradicts previous research showing attitudes, relative to subjective norms and perceived behavioural control, have the most pervasive influence on intentions to engage in physical activity (Hagger *et al.*, 2002) and walking (Eves *et al.*, 2003; Scott *et al.*, 2007). This suggests that other factors, such as distance to school, may be repressing walk to school behaviour for *Long-distance Non-*

Walkers despite positive attitudes being held by this segment. Further, more broadly, this finding highlights the possibility of variation in the capacity of behavioural theories, such as the TPB, to explain and predict the behaviour across segments within a broader target audience and provides an important avenue for future research.

Implications

The present research extends research in market segmentation within social marketing. In particular, by employing the TPB, this research provides further empirical insight into the potential for inclusion of behavioural theories within the process of market segmentation. Specifically, the study demonstrates the usefulness of the TPB factors (subjective norms, attitude, perceived behavioural control, and behavioural intentions) in identifying distinct segments. This result provides empirical evidence supporting the value of employing behavioural theories in market segmentation (Doner Lotenberg *et al.*, 2012), with three of the four highly important segmentation variables in this study representing TPB constructs. In contrast, demographic factors typically investigated in active transportation research, such as the number of cars owned by the household, the age of the child and the socio-economic status of caregivers (e.g. Merom *et al.*, 2006; Rodriguez and Vogt, 2009; Spallek *et al.*, 2006; Yeung *et al.*, 2008), were not found to be as important in segmenting the market.

The research provides insight into the validity of market segmentation within the context of positively changing the physical activity behaviour of children. Three distinct segments of caregivers were identified in the study, each with unique attitudes toward and beliefs about their primary school children walking to/from school. The existence of distinct segments may provide additional insight to the finding that most programs report only a small level of

effectiveness or a slight increase in children's active transportation to school (Chillón *et al.*, 2011). That is, it is possible that these programs may be having a differential effect on distinct segments within the market, consistent with extant literature in social marketing (Gray and Bean, 2011; Walsh *et al.*, 2010), possessing a greater effect in some segments than others and confounding the overall program effect. This proposition should be tested in future research.

For social marketers working toward improving children's physical activity levels, particularly walk to school levels, this research provides market insights. The study identifies three distinct market segments that could be targeted by social marketing programs. In comparison to *Short-distance Frequent Walkers*, there exists a greater need to increase walk to school behaviour for the *Middle-distance Sporadic Walkers* and if possible, the *Long-distance Non-walkers* segments. *Long-distance Non-walkers* are the second largest segment; however, they tend to live further than 5kms from school. This poses a significant environmental barrier to walking to school (e.g. Merom *et al.*, 2006) and may be reducing this segment's perceived behavioural control, which is the lowest of the three segments. Social marketing programs could focus on creating opportunities for *Long-distance Non-walkers* to walk a part of the distance to school. A walking school bus, for instance, could be initiated starting 1km from school from a central point like a train station. Such strategies should increase the segment's perceived behavioural control, which reflects individuals' beliefs regarding access to resources and opportunities needed to perform a behaviour (Taylor *et al.*, 2005), and subsequently, lead to higher levels of walk to and from school behaviour according to the TPB (Ajzen, 1991).

Middle-distance Sporadic Walkers mostly live less than 2kms from school and possess, on average, a more positive intention to increase their child's walk to school behaviour. Based on the analysis, social marketing programs could target the subjective norm perceptions of *Middle-distance Sporadic Walkers*, as well as their attitude, to encourage increased walk to school behaviour in line with the TPB (Ajzen, 1991). The social norms approach could be employed to change this segment's social norm perceptions regarding children walking to and from school. The social norms approach corrects misperceptions about, or increases the saliency of, the social norms surrounding the target behaviour typically through traditional media (Burchell *et al.*, 2013). In terms of attitude, it may be beneficial for programs to focus on augmenting *Middle-distance Sporadic Walkers*' belief that walking to school is beneficial and enjoyable specifically, given their mean affective attitude score was the lowest of all three segments.

Conclusion

This research aimed to further investigate the applicability of market segmentation within social contexts related to improving the health of children. The results showed three distinct market segments within the walk to school context that were clearly defined by the TPB constructs. Caregivers within these segments possessed significantly different beliefs and attitudes towards their primary school children walking to/from school. However, given the purposive sampling technique employed by this exploratory study, the generalisability of the results is limited. A larger scale study is recommended to extend our understanding and to permit generalisability. Furthermore, whether the segments identified by this research respond to social marketing programs differently was not investigated. A longitudinal research design is recommended to permit an examination of response for each of the

segments identified in the current study to a social marketing intervention targeting walking behaviour for school children. Nevertheless, this study provides a basis for future research investigating the applicability and usefulness of market segmentation in marketing aiming to change the physical activity behaviours of children, an important focus given the increasing prevalence and consequence of childhood obesity.

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